A FILLED BAKERY PRODUCT AND A METHOD FOR ITS PRODUCTION

DESCRIPTION

Field of Application

The present invention broadly relates to filled bakery products, commonly referred to as "snacks", wherein the envelope and the filling develop a much appreciated crisp/soft organoleptic contrast, such as is typical of products made up of a creamy core fill and an enfolding wafer, for example.

Although not limited to, the invention relates in particular to a sweet bakery product as above, wherein the envelope is wafer-like crisp and shaped to completely enfold a respective creamy filling in an overall configuration that may be tubular, "ravioli-like", shell-shaped, or else.

More particularly, the invention relates to a method of producing a bakery product as above on an industrial scale.

Prior Art

Wafers or waffles are widely utilized in pastry, fashioned as cones, "cannoli", cookies, and the like, on account of their crisp and crunchy properties. In particular, they are used as eatable holders for ice or whipped cream, where their crisp friable texture provides a pleasant contrast to the soft creamy consistency of ice or whipped cream.

Wafers can be prepared from a suitable fluid dough or batter, which is first baked quickly in an oven or under a heated platen press (wafer maker) and then "typically" reduced to a desired final shape, e.g. rolled up, while still hot.

This shaping operation is to be completed at a fast rate while the baked batter is still hot, i.e. at such a temperature that allows it to remain "plastic" for hand or mechanical processing. When allowed to drop below a temperature that can be called substantially a transition temperature, the batter turns into a properly named wafer, having a "glassy" texture that is easily cracked or broken up into crumbles and,

therefore, no further workable.

Examples of a crisp rolled wafer wrap and its preparation process are disclosed in US Patent 4,624,855, incorporated hereto by this reference.

Also known are tubular wafer wraps, usually in the form of small-diameter cigarette-shaped wraps which are used almost exclusively to make small crisp snack products that may optionally be filled, but not to make suitably filled snacks.

All prior methods of making filled bakery products consisting of a wafer envelope as above and a creamy filling of choice provide for the shaping and wafer-filling steps to be carried out after the baking. As previously mentioned, the wafer blanks are rolled up around a mandrel directly as they leave the oven, while the baked batter is at a high temperature and still deformable plastically, and is followed by the filling operation as soon as the baked paste changes on cooling to a crisp wafer of the desired tubular shape.

Although widely adopted, conventional methods have well-recognized shortcomings, among which is a limited selection of "shapes" that the wafer envelope can take, due to the fast rate at which the shaping must be completed; a limited selection of fillings due to the crisp wafer envelope being so frail that creamy fillings must be used which have such a "viscosity" (or flowability) for them to be pumped at very low pressures that will not harm the envelope integrity.

In addition, due to the frail nature of the wafer envelope, the latter is difficult to fill evenly, and an unevenly filled wafer envelope is easily cracked at any filling vacancies.

Summary of the Invention

The underlying problem of this invention is to provide a method of making a filled bakery product comprised of a crisp envelope, such as a wafer, and a creamy filling, which has functional features effective to overcome the aforementioned shortcomings of the prior art, i.e. to expand the choice of shapes for the crisp envelope, optimize envelope

filling with a creamy filling, and to allow the use of creamy fillings of any desired types in any desired amounts.

The problem resolving idea is basically one of shaping, and optionally filling, the wafer before the baking step, thus imparting a respective batter manipulative and plastic deformation properties by control of its moisture content rather than its temperature as is currently done. In this way, the process for obtaining a filled bakery product that includes a wafer-like crisp, crunchy envelope is relieved of subjection to the "glass transition temperature" constraint, in the sense given to the term above, that has been limiting prior processes.

Based on this idea, said technical problem is solved by a method according to the invention comprising the steps of:

a) spreading a wafer batter into a layer 0.5 to 5 mm thick, and adjusting its moisture content to 15-30%, thereby obtaining a corresponding dough sheet that is plastically deformable and can be processed mechanically;

b) associating a filling of creamy consistency with said dough sheet;

c) shaping said dough sheet into a plastically deformable envelope adapted to enfold and retain said filling;

d) baking said envelope and its filling in an oven at 150-250°C for 15-30 seconds to provide a filled bakery product whose baked envelope of dough sheet has a moisture content of 3-8%, being typical of wafers, and upon cooling becomes as crisp and crunchy as a wafer.

Preferably, said dough sheet is obtained by heating/baking the batter layer up to a moisture content of 15-30%.

Advantageously, the filling is an anhydrous cream, optionally incorporating granulate ingredients, such as hazel nut, almond, and the like.

The degree of plasticity of a dough sheet having the above moisture content and thickness in the above range, and its resulting mechanical

processability, allows said dough sheet to be fashioned into any preferred shape around the creamy filling of choice. For example, a roughly cylindrical tubular envelope, or a jewel-like or jewel setting shaped envelope/container, or a "tortello" shaped envelope can be obtained, irrespective of the size of the product to be produced and the ratio of wafer envelope to creamy filling. The shape, size and ratio are then "set" in the end product by baking followed by cooling.

Thus, for example, to produce a filled bakery product of the type under consideration with a wafer-like crisp, crunchy envelope of cylindrical tubular shape on a industrial scale, the method of this invention comprises the steps of:

a) continuously forming a thin layer of a wafer batter into a continuous web 0.5 to 5 mm thick;

b) baking said continuous batter web to provide a plastically deformable, continuous dough sheet of predetermined width with a moisture content of 15-30%;

c) continuously depositing a filling of creamy consistency onto said plastically deformable dough sheet, with said filling being spread lengthwise thereon to a smaller width than the width of said dough sheet such that at least one edge lap of the dough sheet is left uncovered by said filling;

d) rolling up said dough sheet into a continuous tubular envelope enfolding said filling by continually upturning said at least one edge lap and vaulting it over said filling;

e) further baking said envelope and the filling therein in an oven at 150-250°C for 15-30 seconds, to provide a tubular filled blank of substantially cylindrical shape in which the envelope has a moisture content of 3-8%, as is typical of wafer;

f) cutting said blank across to provide blank cuttings of predetermined lengths that will form said filled bakery products.

If desired, said substantially cylindrical continuous tubular blank and

its filling may additionally be shaped, e.g. fashioned into a slightly flattened substantially parallelepipedic shape, while still hot, before cutting it up as described above.

Preferably, the batter is laid as a thin layer onto a conveyor that will move it through the various processing stations of the inventive method.

The dough sheet is rolled into the continuous tubular envelope with the aid of conventional stationary shares or rotary cone lappers acting on at least one side of the dough sheet to continuously upturn the corresponding edge lap thereof left uncovered by the filling and vaulting it over said filling to contact the opposite edge lap of the dough sheet.

It should be noted that, unlike known methods, the method of this invention does not provide for a wafer to be filled and shaped as such, but rather steps of filling and shaping a hot dough sheet obtained from a wafer-batter that has a moisture content and consistency effective to impart a high degree of plastic deformability and machinability. This allows the above filling and shaping steps to be carried out continuously and easily on an industrial scale, at no risk of cracking the envelope.

It is only during the final step of fast baking that the wrap, upon being cooled below said "glass transition" temperature, takes the typical properties of a wafer and the desired crispness, at which stage the consequent friability is no longer a problem.

The advantages and features of the invention should become understood from a description of an embodiment of the inventive method for obtaining filled bakery products with a wafer envelope of tubular shape. The description should be read in conjunction with the accompanying exemplary and non-limitative drawings.

Brief Description of the Drawings

Figure 1 is a block diagram illustrating the method of this invention, as employed to obtain filled bakery product with a tubular envelope.

Figure 2 is a perspective view of a filled bakery product with a tubular wafer envelope, as obtained by the method of Figure 1.

Figures 3 to 5 are schematic perspective views of details of an apparatus implementing the method of Figure 1.

Figures 6 to 9 show schematically different shapes of the filled bakery product obtained by the method of this invention.

Detailed Description

With reference to the drawings, a method according to this invention for producing a filled bakery product 1 will be described, the product 1 comprising (Figure 2) an envelope 2, specifically a tubular crisp envelope similar to a traditional wafer, and an anhydrous creamy filling 3.

In a preferred non-limitative embodiment, said tubular envelope 2 is slightly flattened, substantially into a parallelepipedon with rounded corners. Preferably, the length of the filled bakery product of this invention is in the range of 100 mm, and its thickness in the range of 15 mm, so that it can fit in one's pocket.

The method for continuously producing said filled bakery product 1 on an industrial scale starts with the preparation (step I) of a wafer-batter on a conventional planetary mixer, for example, from which said batter will be pumped continuously into a hopper 5.

Said hopper 5 (Figure 3) comprises basically a reservoir 6 of a given capacity which includes a means, not shown, for keeping said batter stirred gently.

From an adjustable port 7 located near the bottom of the reservoir 6, the batter issues continuously (step II) onto a transport 8 as a thin layer, such that a continuous web 9 of wafer batter is formed which has a corresponding thickness and predetermined breadth.

According to one characteristic of this invention, the thickness of said continuous wafer batter web is in the range of 0.5 to 5 mm, preferably

0,5 to 2.5 mm.

The transport 8 is supported and driven conventionally to take the continuous batter web 9 through all the processing stations of the method according to the invention, as explained hereinafter.

The batter web 9 is fed continuously (step III) by the transport 8 to a pre-baking or first baking station in the form of an oven 10 heated at 150-230°C, and held there for 10-15 seconds, whereafter a continuous hot dough sheet 11 will issue from the oven 10 which has a moisture content of 15-30% and a predetermined width.

It should be noted that, because of its relatively high moisture content and its temperature at the oven outlet, said dough sheet 11 is deformable plastically and, therefore, easy to work by hand or mechanically at no risk for its integrity.

A selected anhydrous filling 3 of a creamy consistency is deposited continuously (step IV) onto the hot dough sheet 11 as this emerges from the oven 10 (Figure 4) using a doctoring device 12, known per se. Said filling 3 is laid lengthwise onto the dough sheet 11 to a smaller width than the sheet, so that two edge laps 11a, 11b are left uncovered by the filling on the dough sheet 11. Provided downstream of the doctoring device 12 is an upturning means 13, e.g. a stationary share or a rotary cone lapper, arranged to act on one side of said hot sheet 11 and upturn its corresponding edge lap 11b (step V) to vault it over the creamy filling 3 deposited on the dough sheet, thereby to form a substantially cylindrical, continuous tubular envelope 14 enfolding said filling 3.

At this stage (Figure 4), the resulting filled tubular envelope 14 is fed continuously (step VI), while still hot and plastically deformable, by the moving transport 8 to a quick-baking oven 15 (second baking) at 150-250°C for a residence time of 15-30 seconds, whereafter a filled tubular blank 14a will issue from said oven in which the envelope has a moisture content of 2.8-8%, as is typical of traditional wafer.

A radio-frequency oven is preferred for the second-baking oven 15.

Upon exiting the oven 15 (step VII), said filled tubular blank 14a is cut ultrasonically, while still hot, into a succession of cuttings, which are then cooled (step VIII) through a specially provided tunnel to form the bakery products 1 according to the method of this invention and forwarded to a packaging station.

Upon cooling, as the temperature of the blank cuttings 14a drops below the so-called "glass transition" temperature, the envelope of each such cuttings takes the same crispness and friability as traditional wafers.

It should be noted that, before the above cooling step, and preferably before the cutting step, the filled tubular blank 14a is deformable plastically to a degree because still hot, so that it may optionally be further shaped overall, e.g. given a slightly flattened near-parallelepipedic shape under a suitable amount of pressure, or be slightly bent to a large radius, or the like.

EXAMPLE

A wafer-batter was prepared by loading 25 to 35 g wheat flour, 10-20 g sugar, 4-8 g powder milk (or milk serum), 0.5-2 g vegetable fat, 4-8 g glucose syrup, 2-5 g cocoa, 0.05-0.2 g soy lecitin, and 30-40 g water into a planetary mixer.

An anhydrous cream containing particulate cereal matter 4, such as rice, wheat, sugar, malt, or the like, was prepared separately in a suitable blender. The anhydrous cream comprises sugar, vegetable oil, cocoa, hazelnut paste, skimmed powder milk, and soy lecitin, and has an Eta viscosity of 1000 to 2500 mPa/s at 35°C.

Preferably, the cream/particulate ratio is in the range of 80/20 to 90/10, better still of 85/15.

The batter was deposited onto an oven bedplate as a thin layer to form a continuous web of wafer-batter having a thickness of 1.2 mm. The web was then baked (pre-baked) in the oven at 170°C for about 20 seconds.

Onto the thus obtained dough sheet issuing from the oven substantially at the same temperature it had within the oven and with a moisture content of about 27%, a continuous strand of said anhydrous cream was laid, and the dough sheet rolled up to enfold the cream, thereby providing a filled tubular envelope. By a second baking step, at 190°C for about 18 seconds (full baking), the moisture content of the envelope of dough sheet was brought down to 3.5%. The end product, obtained by cooling and cutting up said envelope into cuttings of selected lengths (100 mm), had a weight of 25 g (the weight of the wafer envelope was 5 g and that of the creamy filling 20 g), and an apparent density of 0.52-0.54 g/cm^3.

The method of this invention yields filled bakery products, wherein:

- the tubular envelope is crisp and friable same as a traditional wafer, and can be fashioned to any desired overall size and shape, e.g. a so-called pocket size;

- the anhydrous creamy filling can vary in amount and quality within a wide range;

- the filling operation is carried out in a simple repetitive manner and can be automated to ensure that the filling spreads optimally inside the end product, this being done without jeopardizing the envelope integrity because the process is carried out ahead of the baking.

Changes and modifications can be made unto the invention described hereinabove. For example, the tubular envelope could be cut into a succession of cuttings of predetermined lengths before the second-baking step, the latter being designed to make the inventive product as crisp as desired. In addition, the cutting can be performed using a suitably constructed, sized and driven knife. In some cases, a water blade has proved advantageous.

Furthermore, as mentioned in the foregoing description, the method of this invention can yield filled bakery products in a variety of configurations on an industrial scale, yet within the protection scope of the appended claims. For example, "double tubular" products, as

shown in Figures 5 and 6, could be provided with envelope of different "colors" arranged to lie parallel in side-by-side or spaced-apart relationship, or "tortello-shaped" products as shown in Figures 7 and 8, and sandwich-shaped ones as shown in Figure 9, also are viable.